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## BIOGRAPHICAL SKETCH

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NAME Chang, Gwong-Jen J.		POSITION TITLE Team Leader, Research Microbiologist	
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR	FIELD OF STUDY
National ChungHsing University; Taiwan	Bachelor	1974	Veterinary Medicine
National Taiwan University; Taiwan	Master	1976	Vet. Microbiology
Colorado State University, Fort Collins, CO	Ph.D.	1986	Microbiology/Biochemistry

### A. Professional Experience:

**1986-1988**     **Post-Doctoral Research Associate**, National Research Council, Molecular Biology Branch, Division of Vector-Borne Infectious Diseases (DVBID), CDC, Fort Collins, CO

**1988-**         **Research Microbiologist**, Arbovirus Disease Branch, DVBID, CDC, Fort Collins, CO

**1990-**         **Affiliate Faculty**, Department of Microbiology, Colorado State University, Fort Collins, Colorado

**1995-**         **Term Leader**, Molecular Epidemiology and Immunochemistry Laboratory, Arbovirus Diseases Branch, DVBID, CDC, Fort Collins, CO

**2000-**         **Member of NCID peer-review board**

**2007-**         **Member of DVBID animal use committee**

**2004-2006**     **NIH study group on Vaccine research and emerging diseases research.**

### B. Selected peer-reviewed publications and book chapters.

1. Szu-Chia Hsieh, S.-C., I.-J. Liu, C.-C. King, **G. J. Chang**, and W.-K. Wang. A strong endoplasmic reticulum retention signal in the stem-anchor region of envelope glycoprotein of dengue virus type 2 affects the production of subviral particles. (**Manuscript in preparation**).
2. Chiou, S.-S., W. D. Crill, and **G. J. Chang**. Differential Diagnosis of Japanese Encephalitis Virus Infection Using Cross-Reactive Reduced Virus-Like Particles. (**Manuscript in preparation**).
3. Roberson, J., W. D. Crill and **G. J. Chang**. Differentiation Of West Nile Virus And St. Louis Encephalitis Virus Infections in Serodiagnostic Assays Using Reduced Cross-Reactive Noninfectious Virus-Like Particles. (**Manuscript in preparation**).
4. Martin J. E., C. P Theodore, S. Hubka, S. Rucker, I. J. Gordon, M. E. Enama, C. A. Andrews, Q. Xu, B. S. Davis, M. Nason, M. Fay, R. A. Koup, R. T. Bailer, P. L. Gomez, J. R. Mascola, **J. G. Chang**, G. J. Nabel, B. S. Graham and the VRC 302 Study Team. A West Nile Virus DNA Vaccine is Safe and Induces Neutralizing Antibody in Healthy Adults in a Phase I Clinical Trial. J. Infectious Diseases. (in press)
5. Russell B. J., J. O. Velez, J. J. Laven, A. J. Johnson, **G. J. Chang**, R. S. Lanciotti, B. W. Johnson (2007). A Comparison of concentration methods applied to non-infectious flavivirus recombinant antigens for use in diagnostic serological assays. J. Virological Methods. (In press).
6. Daniele B. A. Medeiros, Márcio R. T. Nunes, Pedro F. C. Vasconcelos, **G. J. Chang**, Goro Kuno. (2007). Complete genome characterization of Rocio virus (*Flavivirus: Flaviviridae*): A Brazilian flavivirus isolated from a fatal case of encephalitis during an epidemic in São Paulo state. J. General Virol. (In press).

7. Bunning, M. L., P. E. Fox, R. A. Bowen, N. Komar, **G. J. Chang**, T. J. Speaker, M. R. Stephens, N. Nemeth, N. A. Panella, S. A. Langevin, P. Gordy, M. Teehee, P. R. Bright, and M. J. Turell. (2007). DNA vaccination of the American Crow (*Corvus Brachyrhynchos*) provides partial protection against lethal challenge with West Nile virus. *Avian Diseases*. 51:573–577.
8. Crill, W. D., Trainor, N. and **G. J. Chang**. (2007). A Detailed Mutagenesis Study of Flavivirus Cross-Reactive Epitopes using West Nile Virus-like Particles. *J. General Virol.* 88:1169-1174.
9. Trainor, N. Crill, W. D., Roberson, J. and **G. J. Chang**. (2007). Mutation Analysis of the Fusion Domain Region of St. Louis Encephalitis Virus Envelope Protein. *Virology*. 360: 398-406.
10. Chao, D-Y. B. S. Davis and **G. J. Chang**. (2007). Development of Multiplex Real-Time Reverse Transcriptase PCR Assays for Detecting Eight Medically Important Flaviviruses in Mosquitoes. *J. Clin. Microbiol.* 45:584-589.
11. **Chang, G. J.**, B. S. Davis, C. Stringfield, and C. Lutz. (2007). Prospective immunization of the endangered California condors (*Gymnogyps californianus*) protects this species from lethal West Nile virus infection. *Vaccine*. 25:2325-2330.
12. Kuno, G., and **G. J. Chang**. (2007). Full-Length Sequencing and Genomic Characterization of Bagaza, Kedougou, and Zika Viruses. *Arch. Virol.* 158:687-696.
13. Kuno, G., and **G. J. Chang**. (2006). Characterization of Sepik and Entebbe Bat Viruses Closely Related to Yellow Fever Virus. *Am. J. Trop. Med. Hyg.* 75: 1165-1170.
14. Chien, L.-J. T.-L. Liao, P.-Y. Shu, J.-H. Huang, D. J. Gubler, and **G. J. Chang**. (2006). Development of Real-Time Reverse Transcriptase-PCR Assays to Detect and Serotype Dengue Viruses. *J. Clin. Microbiol.* 44:1295-1304.
15. Kuno, G., and **G. J. Chang**. (2005) The Biological Transmission of Arboviruses: Re-examination of and New Insights into the Components, Mechanisms, and Unique Traits as well as their Evolutionary Trends. *Clin. Microbiol. Rev.* 18: 606-637.
16. Chao, D.Y., C. C. King, W. K. Wang, W. J. Chen, H. L. Wu, and **G. J. Chang**. (2005) Strategically Examining the Full-Genome of Dengue Virus Type 3 in Clinical Isolates Reveals Its Mutation Spectra. *Virol. J.* 2:71
17. Holmes, D. A., D. E. Purdy, D-Y. Chao, A. J. Noga, and **G. J. Chang**. (2005) Comparative Analysis of the IgM-capture Enzyme-linked Immunosorbent Assay Using Virus-like Particles or Virus-infected Mouse Brain Antigens to Detect IgM Antibody in Patient Serum with Evidence of Flaviviral Infection. *J. Clin. Microbiol.* 47:3227-3236.
18. Purdy, D. E. and **G. J. Chang**. (2005) Secretion of Noninfectious Dengue Virus-like Particles and Identification of Amino Acids in the Stem Region Involved in Intracellular Retention of Envelope Protein. *Virology*. 333:239-250.
19. Nisbert, D. J., K. J. Lee, A. F. van den Hurk, C. A. Johansen, G. Kuno, **G. J. Chang**, J. S. Mackenzie, S. A. Ritchie, and R. A. Hall (2004) Identification of new flaviviruses in the Kokobera virus complex. *J. Gen. Virol.* 86: 121-124.
20. Crill, W. and **G. J. Chang**. (2004) Localization and characterization of flavivirus envelope glycoprotein cross-reactive epitopes. *J. Virol.* 78:13975-13986.
21. Purdy, D. E.; A. J. Noga, and **G. J. Chang**. (2004) A Noninfectious Recombinant Antigen for ELISA Detection of Serum Antibodies to St. Louis Encephalitis Virus. *J. Clin. Microbiol.* 42: 4709-4717.
22. **Chang, G. J.**, G. Kuno, D. E. Purdy, B. S. Davis. (2004). Recent advancement in flavivirus vaccine development. *Expert Rev Vaccines*. 3:199-220.
23. Roehrig, J. T., K. E. Volpe, J. Squires, A. R. Hunt, B. S. Davis, and **G. J. Chang**. (2004) Contribution of disulfide bridging to epitope expression of the dengue type 2 virus envelope glycoprotein. *J. Virol.* 78:2648-2652.
24. Austgen, L. E, R. A. Bowen, M. L. Bunning, B. S. Davis, C. J. Mitchell, and **G. J. Chang**. (2004) Experimental infection of cats and dogs with West Nile virus. *Emerg Infect Dis.* 10:82-86.

25. Turell, M. J., M. Bunning, G. V. Ludwig, B. Ortman, **G. J. Chang**, T. Speaker, A. Spielman, R. McLean, N. Komar, R. Gates, T. McNamara, T. Creekmore, L. Farley, and C. J. Mitchell. (2003) DNA Vaccine for West Nile Virus Infection in Fish Crows (*Corvus ossifragus*). *Emerg Infect Dis.* 9:1077-1081.
26. **Chang, G. J.**, A. R. Hunt, D. A. Holmes, T. Springfield, T.-S. Chiueh, J. T. Roehrig, D. J. Gubler. (2003) Enhancing biosynthesis and secretion of premembrane and envelope proteins by the chimeric plasmid of dengue virus type 2 and Japanese encephalitis virus. *Virology.* 306:170-180.
27. **Chang, G. J.**, B. S. Davis, A. R. Hunt, D. A. Holmes, G. Kuno. (2001) Flavivirus DNA vaccines: current status and potential. *Ann. N. Y. Acad. Sci.* 951: 272-285.
28. Kuno, G., H. Artsob, N. Karabatsos, K. R. Tsuchiya, and **G. J. Chang**. (2001) Genomic sequencing of deer tick virus and phylogeny of powassan-related viruses of North America. *Am J Trop Med Hyg.* 65:671-676.
29. Hunt, A. R., C. B. Cropp, and **G. J. Chang**. (2001) A recombinant particulate antigen of Japanese encephalitis virus produced in stably-transformed cells is an effective noninfectious antigen and subunit immunogen. *J Virol Methods.* 97:133-149.
30. Martin, M., T. F. Tsai, B. Cropp, **G. J. Chang**, D. A. Holmes, J. Tseng, W. Shieh, S. R. Zaki, I. Al-Sanouri, A. F. Cutrona, G. Ray, L. H. Weld, and M. S. Cetron. (2001) Fever and multisystem organ failure associated with 17D-204 yellow fever vaccination: a report of four cases. *Lancet.* 358:98-104.
31. Davis, B. S., **G. J. Chang**, B. Cropp, J. T. Roehrig, D. A. Martin, C. J. Mitchell, R. Bowen, and M. L. Bunning. (2001) West Nile virus recombinant DNA vaccine protects mouse and horse from virus challenge and expresses in vitro a noninfectious recombinant antigen that can be used in enzyme-linked immunosorbent assays. *J Virol.* 75:4040-4047.
32. Shieh, W. J., S. M. Jung, C. Hsueh, T. T. Kuo, A. Mounts, U. Parashar, C. F. Yang, J. Guarner, T. G. Ksiazek, J. Dawson, C. Goldsmith, **G. J. Chang**, S. M. Oberste, M. A. Pallansch, L. J. Anderson, and S. R. Zaki. (2001) Pathologic studies of fatal cases in outbreak of hand, foot, and mouth disease, Taiwan. *Emerg Infect Dis.* 7:146-8.
33. Kuno, G., **G. J. Chang**, K. R. Tsuchiya, and B. R. Miller. (2001) Phylogeny of Thogoto virus. *Virus Genes.* 23:211-214.
34. Llewellyn, Z. N., X. Ou, **G. J. Chang**, B. Schmitt, M. D. Salman, and R. K. Akkina. (2000) Genetic analysis of vesicular stomatitis virus-New Jersey from the 1995 outbreak in the western United States. *Am J Vet Res.* 61:1358-1363.
35. **Chang, G. J.**, A. R. Hunt, and B. Davis. (2000) A single intramuscular injection of recombinant plasmid DNA induces protective immunity and prevents Japanese encephalitis in mice. *J Virol.* 74:4244-4252.
36. Huang, C. Y., S. Butrapet, D. J. Pierro, **G. J. Chang**, A. R. Hunt, N. Bhamarapravati, D. J. Gubler, and R. M. Kinney. (2000) Chimeric dengue type 2 (vaccine strain PDK-53)/dengue type 1 virus as a potential candidate dengue type 1 virus vaccine. *J Virol.* 74:3020-3028.
37. Tsai, T. F., **G. J. Chang**, and Y. X. Yu. (1999) Japanese encephalitis vaccines, p672-710. *In* A. P. Stanley, and W. A. Orenstein (ed.), *Vaccines*, 3rd ed. W.B. Saunders, Philadelphia, London, Toronto, Montreal, Sydney, and Tokyo.
38. Kinney, R. M., M. Pfeffer, K. R. Tsuchiya, **G. J. Chang**, and J. T. Roehrig. (1998) Nucleotide sequences of the 26S mRNAs of the viruses defining the Venezuelan equine encephalitis antigenic complex. *Am J Trop Med Hyg.* 59:952-964.
39. Kanesa-athan, N., **G. J. Chang**, B. L. Smoak, A. Magill, M. J. Burrous, and C. H. Hoke Jr. (1998) Molecular and epidemiologic analysis of dengue virus isolates from Somalia. *Emerg Infect Dis.* 4:299-303.
40. Kuno, G., **G. J. Chang**, K. R. Tsuchiya, N. Karabatsos, and C. B. Cropp. (1998) Phylogeny of the genus *Flavivirus*. *J Virol.* 72:73-83.

41. **Chang, G. J.** (1997) Molecular Biology of Dengue Viruses. p175-198. In Dengue/Dengue Hemorrhagic Fever (ed. D. J. Gubler and G. Kuno). CAB International.
42. McFarland, J. M., L. M. Baddour, J. E. Nelson, S. K. Elkins, R. B. Craven, B. C. Cropp, **G. J. Chang**, A. D. Grindstaff, A. S. Craig, and R. J. Smith. (1997) Imported yellow fever in a United States citizen. Clin Infect Dis. 25:1143-1147.
43. Kinney, R. M., S. Butrapet, **G. J. Chang**, K. R. Tsuchiya, J. T. Roehrig, N. Bhamarapravati, and D. J. Gubler. (1997) Construction of infectious cDNA clones for dengue 2 virus: strain 16681 and its attenuated vaccine derivative, strain PDK-53. Virology. 230:300-308.
44. Sullivan, D. G., **G. J. Chang**, and R. K. Akkina. (1997) Genetic characterization of ruminant pestiviruses: sequence analysis of viral genotypes isolated from sheep. Virus Res. 47:19-29.
45. Lin, C. Y., C. C. Lin, **G. J. Chang**, and C. C. King. (1997) Defect of cell-mediated immune response against hepatitis B virus: an indication for pathogenesis of hepatitis-B-virus-associated membranous nephropathy. Nephron. 76:176-185.
46. Kuno, G., C. J. Mitchell, **G. J. Chang**, and G. C. Smith. (1996) Detecting bunyaviruses of the Bunyamwera and California serogroups by a PCR technique. J Clin Microbiol. 34:1184-1188.
47. **Chang, G. J.**, B. C. Cropp, R. M. Kinney, D. W. Trent, and D. J. Gubler. (1995) Nucleotide sequence variation of the envelope protein gene identifies two distinct genotypes of yellow fever virus. J Virol. 69:5773-5780.
48. Ni, H., **G. J. Chang**, H. Xie, D. W. Trent, and A. D. Barrett. (1995) Molecular basis of attenuation of neurovirulence of wild-type Japanese encephalitis virus strain SA14. J Gen Virol. 76:409-413.
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51. Sullivan, D. G., **G. J. Chang**, D. W. Trent, and R. K. Akkina. (1994) Nucleotide sequence analysis of the structural gene coding region of the pestivirus border disease virus. Virus Res. 33:219-228.
52. Weaver, S. C., A. Hagenbaugh, L. A. Bellew, S. V. Netesov, V. E. Volchkov, **G. J. Chang**, D. K. Clarke, L. Gousset, T. W. Scott, D. W. Trent, and a. I. et. (1994) A comparison of the nucleotide sequences of eastern and western equine encephalomyelitis viruses with those of other alphaviruses and related RNA viruses. Virology. 202:1083.
53. Ni, H., N. J. Burns, **G. J. Chang**, M. J. Zhang, M. R. Wills, D. W. Trent, P. G. Sanders, and A. D. Barrett. (1994) Comparison of nucleotide and deduced amino acid sequence of the 5' non-coding region and structural protein genes of the wild-type Japanese encephalitis virus strain SA14 and its attenuated vaccine derivatives. J Gen Virol. 75:1505-1510.
54. **Chang, G. J.**, D. W. Trent, A. V. Vorndam, E. Vergne, R. M. Kinney, and C. J. Mitchell. (1994) An integrated target sequence and signal amplification assay, reverse transcriptase-PCR-enzyme-linked immunosorbent assay, to detect and characterize flaviviruses. J Clin Microbiol. 32:477-483.
55. Lewis, J. A., **G. J. Chang**, R. S. Lanciotti, R. M. Kinney, L. W. Mayer, and D. W. Trent. (1993) Phylogenetic relationships of dengue-2 viruses. Virology. 197:216-224.
56. Kinney, R. M., **G. J. Chang**, K. R. Tsuchiya, J. M. Sneider, J. T. Roehrig, T. M. Woodward, and D. W. Trent. (1993) Attenuation of Venezuelan equine encephalitis virus strain TC-83 is encoded by the 5'-noncoding region and the E2 envelope glycoprotein. J Virol. 67:1269-1277.

57. Lewis, J. G., **G. J. Chang**, R. S. Lanciotti, and D. W. Trent. (1992) Direct sequencing of large flavivirus PCR products for analysis of genome variation and molecular epidemiological investigations. *J Virol Methods*. 38:11-23.
58. Lanciotti, R. S., C. H. Calisher, D. J. Gubler, **G. J. Chang**, and A. V. Vorndam. (1992) Rapid detection and typing of dengue viruses from clinical samples by using reverse transcriptase-polymerase chain reaction. *J Clin Microbiol*. 30:545-551.
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60. Roehrig, J. T., A. R. Hunt, **G. J. Chang**, B. Sheik, R. A. Bolin, T. F. Tsai, and D. W. Trent. (1990) Identification of monoclonal antibodies capable of differentiating antigenic varieties of eastern equine encephalitis viruses. *Am J Trop Med Hyg*. 42:394-398.
61. **Chang, G. J.**, B. J. Johnson, and D. W. Trent. (1988) Site-specific oligonucleotide-directed mutagenesis using T4 DNA polymerase. *DNA*. 7:211-217.
62. **Chang, G. J.**, and D. W. Trent. (1987) Nucleotide sequence of the genome region encoding the 26S mRNA of eastern equine encephalomyelitis virus and the deduced amino acid sequence of the viral structural proteins. *J Gen Virol*. 68:2129-2142.

### C. Honor:

<b>2001</b>	Secretary's Award for Distinguish Service
<b>2002</b>	Center for disease Control and Prevention, Charles C. Shepard Science Award for Laboratory and Methods
<b>2002</b>	National Center for Infectious Diseases, James H. Nakano Citation
<b>2003</b>	South East Federal laboratory Consortium, 2003 Excellence in Technology Transfer Award
<b>2004</b>	National Federal laboratory Consortium, 2004 Excellent in Technology Transfer Award

### D. Patents and Pending Patents.

#### Nucleic Acid Vaccines for Prevention of Flavivirus Infections:

Australian patent number: 778988  
 New Zealand patent number: 1509  
 South Africa patent number: 2003/7580  
 U.S. patent number: 7,227,011  
 Chinese patent number: ZL02807758.X  
 EU. Patent number: 1084252

#### Pending Patents.

#### Nucleic Acid Vaccines for Prevention of Flavivirus Infections:

11 additional Countries and EU

#### Localization and Characterization of Flavivirus Envelope Glycoprotein Cross-reactive Epitopes and Methods for Their Use

US PCT filled on July/27/2005